The Kepler Mission was launched to search for extra­solar planets (exoplanets) and further the research of planetary formation and the search for ‘earth­like’ qualities such as mass and density, solar transit period and gravitational fields, which may indicate the habitable environment for life outside our solar system. Hundreds of confirmed exoplanets have been discovered in the last five years, due primarily to the data obtained from the Kepler mission. The most recent data for Kepler (up to May 2013) is still under analysis.

The satellite captured high­resolution images of 100 square degree section of sky at 6.5 second intervals, and planets which transit their host star are detected by periodic fluctuations in stellar intensity. A Transiting Planet Search [Fanelli et al.] algorithm identifies over 100,000 potential planetary transits from 192,313 stars, which is then narrowed to 18,406 threshold­crossing events (TCE) (Christiansen et al.). TCE’s are fitted to a transit curve, and the resulting 5410 stars and planets are termed Kepler Objects of Interest (KOI). A committee and intensive vetting procedure then promote each KOI to a candidate planet (requiring further exploration and confirmation) or a false positive.

In this project, we would like to examine further the characteristics of those false positives with the intent of seeking underlying relationships that might exist among them. We will examine the criteria used in determining what constitutes a Kepler Object of Interest (KOI) and investigate the attributes of false positives KOIs. Kepler data acquisition is currently in hiatus due to mechanical failure, but data over a period of four years is publicly available (“NASA ­ Kepler Guest Observer Program”). Potential benefits include testing existing analysis on this data set, and contributing to the growing knowledge base being created from the data ­ or if we’re very lucky, we could potentially discover a new exoplanet!

1. Project idea
2. Your specific implementation (data, methods, etc.)
3. Key results together with evaluation metrics
4. A description what worked, what did not work, what surprised you, and why